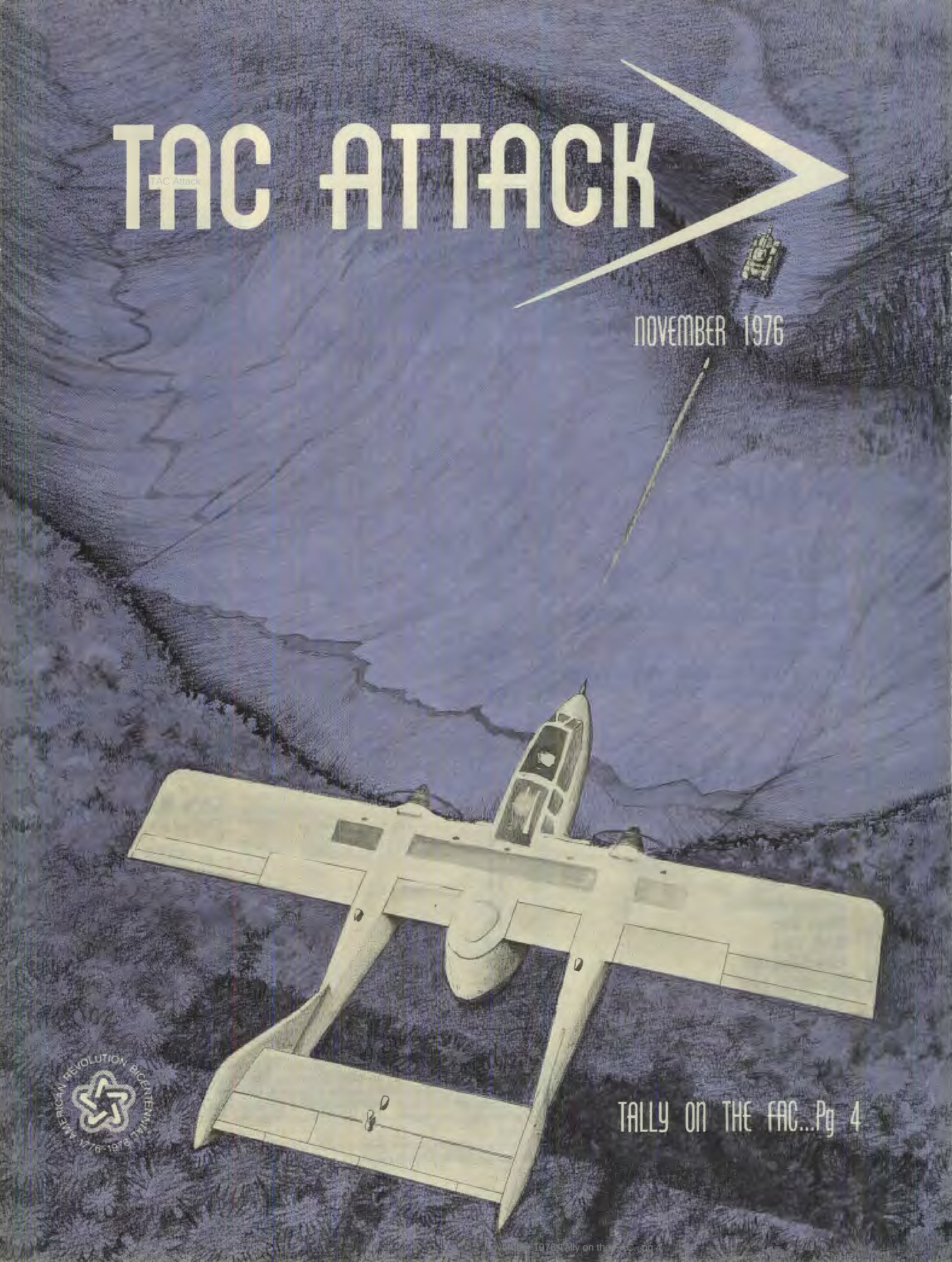
TAC ATTACK

NOVEMBER 1976



TALLY ON THE FAC...Pg 4

TAC ATTACK NOVEMBER 1976 VOLUME 16 NUMBER 11

NOV

FOR EFFICIENT TACTICAL AIR POWER

TACTICAL AIR COMMAND

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COMMANDER

LT GENERAL SANFORD K. MOATS
VICE COMMANDER

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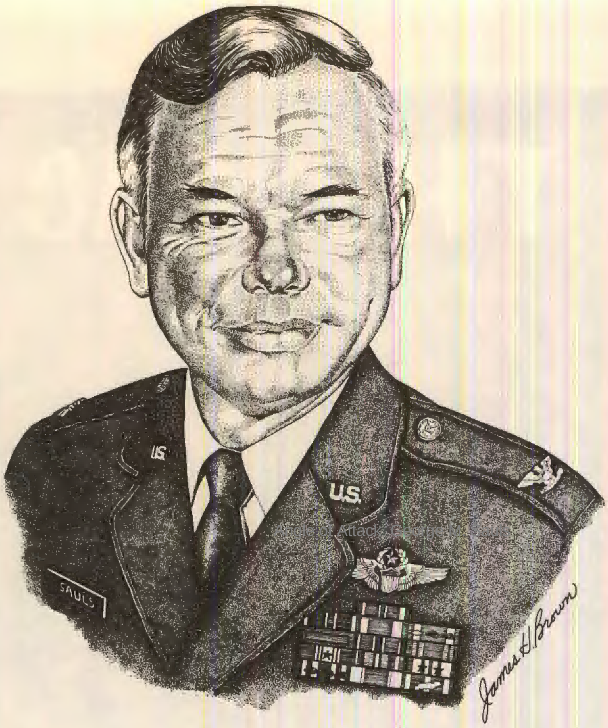
Angle of ATTACK



STAND UP & BE COUNTED

A review of the record confirms my suspicion ... we have found no new ways to have aircraft accidents. The same old cause factors keep appearing time and time again. Only the people involved ... the aircrew, instructor pilot, flight lead, the squadron operations officer, and commander ... have changed.

It is true that our aircrew experience level is lower than we would like it. It is also true that the rated supplement program has absorbed some of our middle management talent, reducing the availability of experienced IPs, flight leads, and flight commanders. Another fact of life is the need to periodically replace squadron commanders and ops officers to allow them individual career advancement and to increase our management force. All this, plus other actions, add up to an unstable, turbulent personnel situation in most units. Recognizing this situation, the problem is how to pass along the lessons painfully learned from the past to today's aircrews and supervisors.

First, there is the proper use of supervisory tools. Supervisors hold the keys to the success of any operation, no matter how large or small. The unit commander must be the number one safety officer ... but his people must carry out the accident prevention program if the organization is to perform its mission safely and effectively. You, from buck pilot to ops officer, must stand up and be counted ... help the commander do his job.

Second is the problem of communication. Failing to get the word out to the troops accounts for a large number of problems that can lead to accidents. You need to ensure that all of your people know exactly what is required of them, and the pitfalls involved in accomplishing the mission.

Finally, compliance with directives is an integral part of effective mission accomplishment. The shortage of people, time, and materiel makes it easy to rationalize short cuts. In the short term, it seems easier to bend a reg than go along with its intent. However, you cannot afford these short cuts which invariably increase our accident potential. If there are regulations, manuals, and tech orders that do not adequately accomplish their intended purpose, you must initiate action to change them.

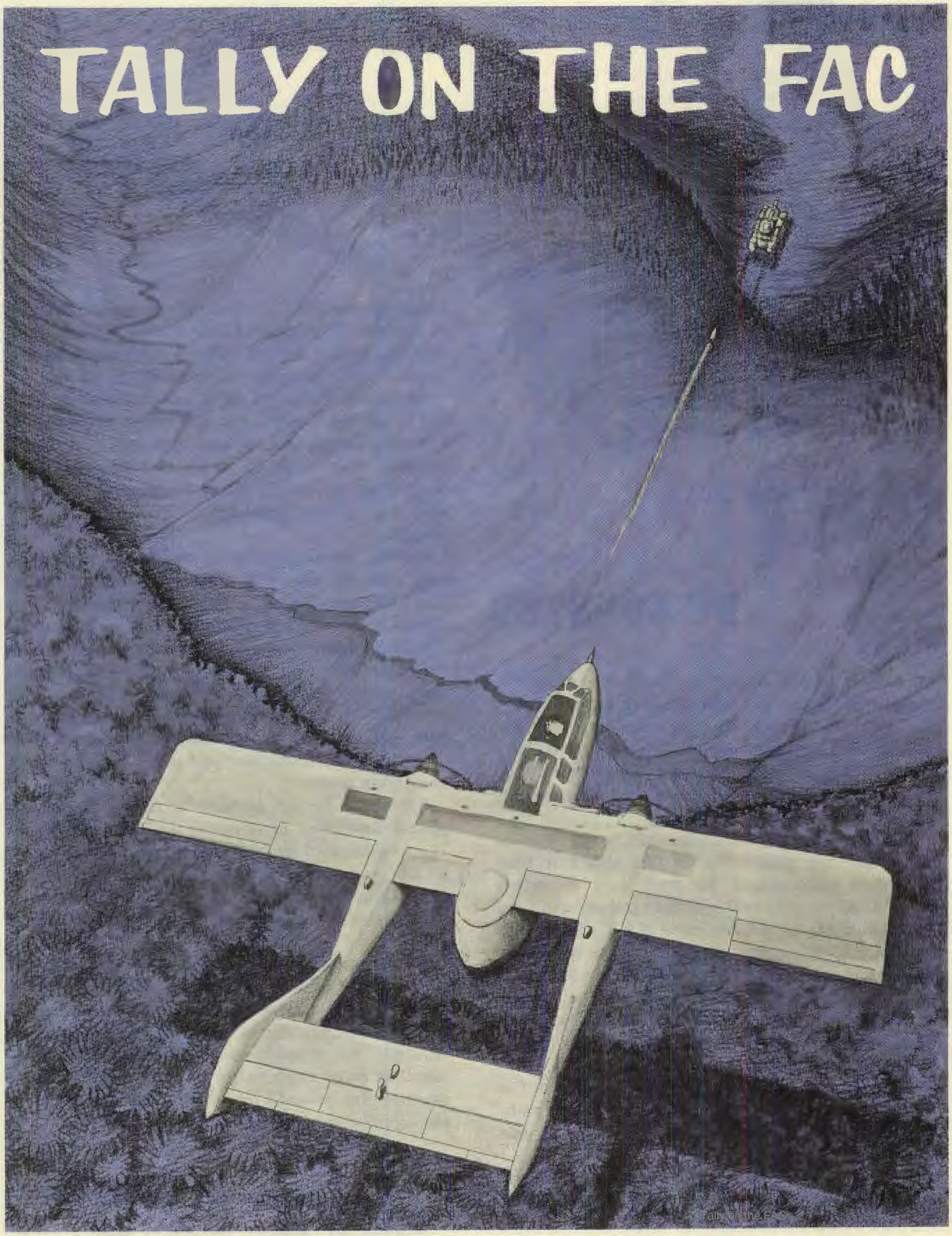
Solutions to our present problems lie in the proper utilization of all of our available resources. The shortage of people coupled with an increase in our workload necessitates we prioritize our tasks to get the most important on top. If safety is not on the top of your list, you've set the wrong priorities.

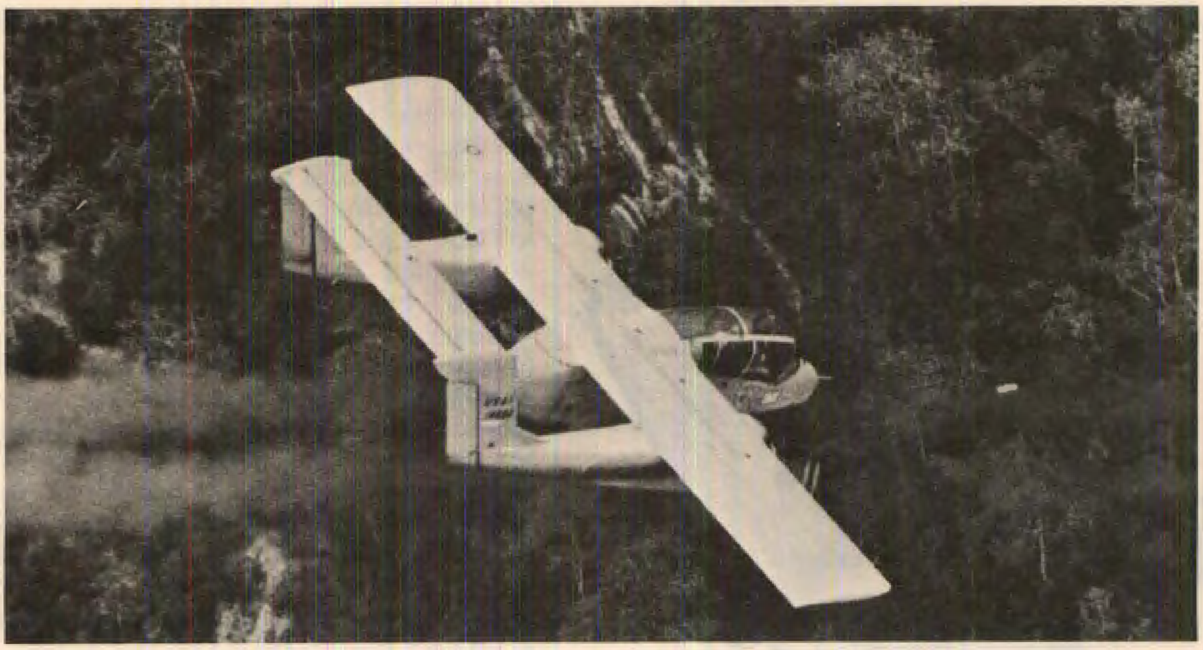
If we properly use what we have, we can reduce the effects of the turbulent personnel situation and increased unit commitments. Each of us must carry more of the responsibility to accomplish the mission in a safe and efficient manner. We must work better as a team if we are to reverse the upward trend of accidents and conserve our combat resources.

George M. Sauls

GEORGE M. SAULS, Colonel, USAF
Chief of Safety

TALLY ON THE FAC





By Capt Duane Tway
602d TAIRCG/Operations and Training
Bergstrom AFB, TX

"Tally on the FAC" sound familiar? The old heads remember "Covey," "Raven," "Nail," "Rash," "Gimpy," and their fast-mover cousins. The new guys may have run into "Timid," "Pave," "Chaps," or "Clunk." In the future, you may seldom hear "Tally on the FAC." The bad guys have come up with a fistful of new weapons that have us (FACs) convinced that "if they can see you, they can shoot you. If they can shoot you, they will probably hit you, etc." Since most of us lack the "into the valley of death rode the 600" perspective, we have been working on new tactics so we don't get seen ... shot ... etc.

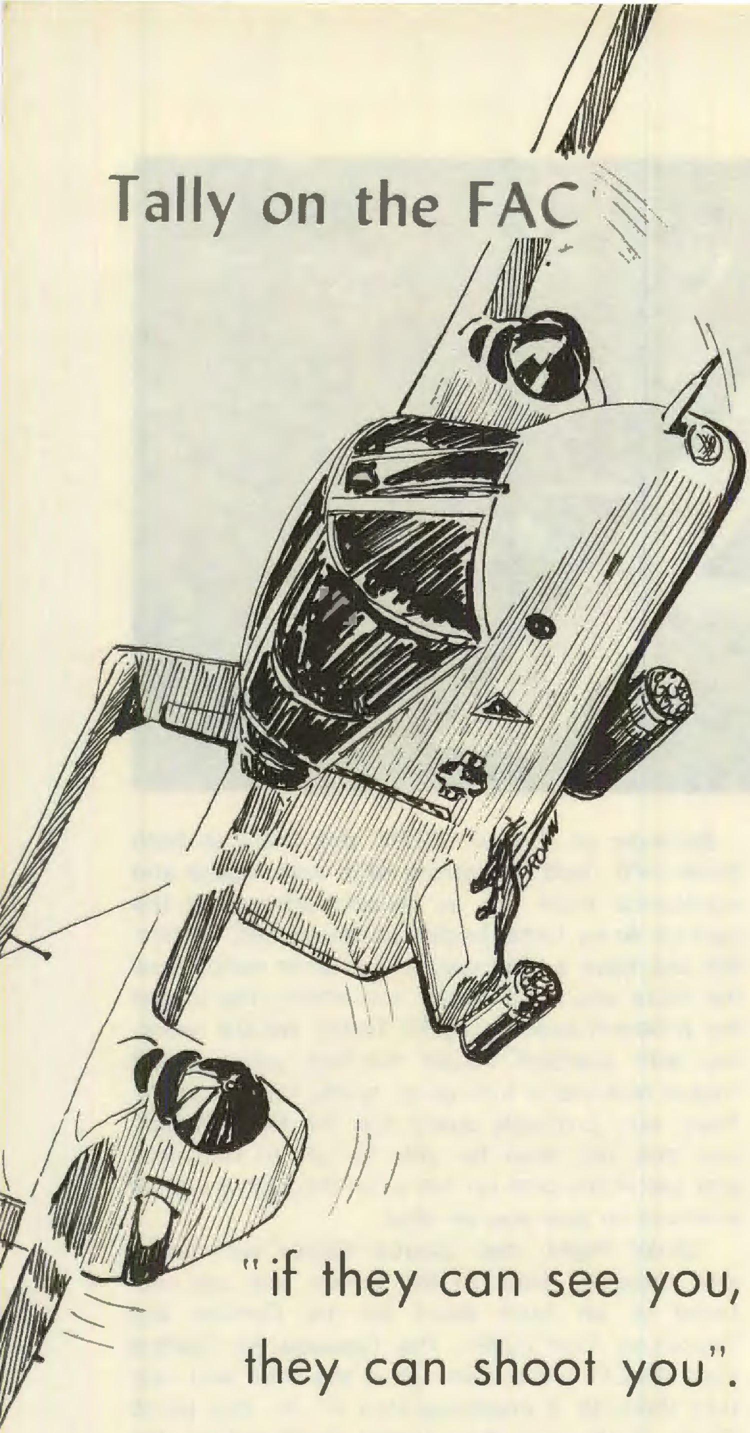
The FAC force must be able to operate in a major portion of the conventional war spectrum. In a low-threat environment, where targets are hard to identify visually, orbiting the target is a viable tactic. But in a different environment ... with SA-6s, -7s, and -9s, ZSU-23-4s, etc . and the target is a Tank Army on the move, old "low-and-slow" had best spend his time down in the weeds providing air-ground coordination for the fighters. Don't bet that you will never see a FAC orbiting a target ... but you probably won't see us as much.

Because of this, in 1974, the FACs at both Shaw AFB and Bergstrom AFB, with inputs and assistance from the air liaison officers at the various Army forts, began updating FAC tactics. We still have a long way to go. (Ever notice how the more you learn about something, the bigger the problem seems to get?) Today, we are working with standoff target marking using a loft rocket technique that gives pretty fair accuracy. Thus, you probably won't see the FAC. In fact, you may not even be able to talk to him until you are in the pop-up. Let's run through a typical scenario to give you an idea.

"Strike Flight," two "Double Uglies" with snake and rockeye, drop off the tanker and are vectored to an orbit point by the Control and Reporting Post (CRP). The Forward Air Control Post (FACP) picks them up in the orbit and vectors them to a predesignated IP. At this point, Strike Flight gets their target briefing from the FAC. If the FAC is too far behind the line of contact to get up out of the weeds and be readable, the FACP will brief the fighters. The briefing sounds something like this: "Alpha, 270, 1+30, right, tanks, 600." The comm jammers may scramble everything right after "right," but Strike Flight still hears enough to get the job done. They have their IP: Alpha, Mag heading from the IP to the target: 270°; time at prebriefed speed from IP to pop-up point, one minute-thirty seconds; the direction to the target from the apex of the pop, right (45° assumed); the target description and altitude, tanks, 600

CAPT DUANE TWAY is this month's Fleagle T-shirt winner.

Tally on the FAC



"if they can see you, they can shoot you".

feet MSL. In this case, friendlies are no factor so they are not mentioned. Strike Flight "greens-em-up" and gets vectors to the IP, descending to minimum safe altitude at the IP. Strike Lead calls "departing," on a heading of 270 at the prebriefed speed. At one minute elapsed time, Strike Lead calls, "Thirty seconds" and the FAC, who is also down in the weeds, sets up and lofts a "Willy-Pete" at the Tank Army. Strike Lead calls "pop" about the time that the smoke from the "Willy-Pete" is blossoming, rolls in and rains destruction on the Foes of Democracy. There probably will not be any BDA unless the Army has a forward observer (FO) who can pass it to the FAC.

This is the sort of thing that you can expect to see on the tactical ranges in the future when working with the FAC. "So ... why is this article in a safety magazine instead of THE FIGHTER WEAPONS REVIEW?" you say. That's right, TAC ATTACK is a safety magazine, and there are obvious safety considerations in any change in tactics. But there are also some hidden "gotchas" in the new FAC scenarios which might be apparent. For instance, it has always been a cardinal rule in any tactical range training to "keep everyone in sight." Now, we are stepping all over that one and advertising that we may never see each other. "OK, so what?" So, now you can't count on the FAC to clear for you when you are momentarily disoriented and belly-up to Three. And the FAC who prebriefs that he will hold northwest of the target better be northwest. (Ever try flying an O-2 at 500 AGL in "wake turbulence from departing F-4s?") So basically, the message is that the FAC force is working on new and better ways to do our job, and until we are all as familiar with the new tactics as we are with the SEA tactics, we all have to be extra careful.

With all of the new tactics you may see (none have been finalized), the prebriefing is all important. Everyone, right down to Blue Four, has got to understand what's going to happen and why. And if it doesn't happen that way ... you better have a "Plan B" handy. During the preflight briefing, if there is anything that you feel might compromise safety, speak up - don't wait until the accident board. If you see anything during a flight that raises a question in your mind, get it out in the open at the debrief. You might save a poor FAC's life (or yours/your wingman's). Know precisely what the FAC expects of you, and what you can expect of the FAC. Remember, when you are both at 500' AGL, you may not be in radio contact. Don't change the game plan. If a question arises in the air, swallow your pride, call King's X and get an answer. But, don't assume anything.

Speaking of new tactics, if there are any old Nails, Ravens, etc, out there who can keep us from reinventing the wheel, we would appreciate having your comments. Drop us a line at either the 602d Tactical Air Control Wing (TAIRCW) at Bergstrom or the 507th TAIRCW at Shaw and share the wealth. See you on the range, and good hunting.

AIRCREWMEN of DISTINCTION

Captain Michael G. Roehr
561st TFS, 35th TFW
George AFB, CA

1st Lt Mark S. Wessel
561st TFS, 35th TFW
George AFB, CA

Captain Roehr and Lieutenant Wessel were scheduled to lead a flight of three Wild Weasel F-105G aircraft on a ground attack mission. Computed ground run was 6,600 feet on a 10,000-foot runway, with a takeoff speed of 188 KCAS.

Approaching nosewheel liftoff speed, Captain Roehr eased the stick back to rotate the aircraft to takeoff attitude. Unexpectedly, the nosewheel remained on the runway. Back pressure was increased until the stick reached its aft limit and the trim button was held in the nose-up position in an unsuccessful effort to rotate the rapidly accelerating Thud. Now well above refusal speed and barrier engagement limits, with very little runway remaining, the aircrew faced the choices of an immediate ejection or continuing the takeoff and hoping for an eventual rotation and liftoff. Captain Roehr determined that continuing the takeoff for a short distance further would not decrease the chances of a successful ejection and might result in an eventual rotation. With this course of action determined, the takeoff was continued, and Lt Wessel alerted to prepare for ejection.

Seconds later, at 205 KCAS, the aircraft abruptly pitched up and literally leaped into the air. Captain Roehr smoothly applied forward pressure to prevent over-rotation and found that the aircraft was slow to respond. Large control inputs were required to produce even a small response, and a series of moderate pitch oscillations ensued.

A climb was initiated, and several controllability checks performed at altitude. It was determined that only pitch control was affected, and Captain Roehr felt confident that he could maintain precise pitch control. After discussing the problem with Operations and the Supervisor of Flying, a decision was made to attempt a landing at low-gross weight and higher-than-normal touchdown speeds to ensure adequate control response.

Captain Roehr executed a flawless approach and touchdown and stopped the aircraft without further incident. Postflight investigation revealed the cause of the malfunction to be a faulty pitch actuator.

The superior airmanship and professionalism displayed by Captain Roehr and Lieutenant Wessel resulted in the recovery of a valuable combat aircraft and prevented possible injury or loss of life. Their actions during this critical emergency qualify them as the Tactical Air Command Aircrewmen of Distinction.

LOW LEVEL WIND SHEAR PART III

DETECTING and COPING with WIND SHEAR

Major Shirley M. Carpenter
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Last month, the author discussed how low-level wind shear can affect an aircraft during final approach and landing. This month, Major Carpenter will give details on the present procedures utilized for dealing with wind shear and the new systems under consideration to enhance a pilot's capability to effectively handle a wind shear situation.

In spite of modern technology, there is not an operational system that will adequately measure wind shear. The International Civil Aviation Organization (ICAO) has made efforts for the last 10 years to establish aeronautical requirements for the measurement and reporting of low-level wind shear. In May 1974, ICAO came to the conclusion that "satisfactory observing and routine reporting to aircraft of wind shear by using conventional equipment is practically impossible." ICAO gave three main reasons why progress in this area has been stagnated:

(1) There is an incomplete understanding of the phenomenon of wind shear and its effects on an aircraft.

(2) There is some question as to what should be measured and reported to the pilots.

(3) There is a lack of equipment suitable for routine use at aerodromes.

Let's examine some of the limitations which hinder pilots in coping with wind shear and then discuss present procedures utilized to deal with the phenomenon and their inadequacies. A brief rundown on what modern technology has to offer in the way of ground-based and airborne wind shear equipment will also be given.

FORECASTING WIND SHEAR

Neither the National Weather Service nor the Air Force Weather Service attempts to forecast low-level wind shear. In July 1975, an FAA representative said, "When the capability of forecasting and measuring wind shear is developed, we will implement procedures for dissemination of the information to pilots." Since there is no forecasting of the phenomenon, the only warning of its existence is when it has been experienced and reported by another pilot.

THE PILOT'S REPORT (PIREP)

ICAO concluded in May 1974, and it is still true today, the PIREPs represent the only available source of information on wind shear along the final approach path. Unfortunately, the efficacy of PIREPs has failed to communicate the existing danger. There are two main reasons why PIREPs are presently ineffective.

First, we do not have adequate terminology to communicate the true severity of the wind shear. For the lack of more descriptive terms, wind shear is normally reported using the same adjectives originally designated by FAA to report the severity of turbulence. However, the effect of wind shear on an aircraft's performance can be entirely different from that of turbulence. Therefore, when a pilot uses turbulence reporting procedures in an attempt to describe the severity of wind shear, the words fail to communicate the real situation.

A vivid example is that of EAL Flight 66 which crashed at Kennedy International Airport on 24 June 1975. Severe wind shear on short final had been reported to the aircrew. They had overheard part of a conversation between the controller and EAL Flight 902 describing not only the severity of the wind shear, but also how violently it had affected the performance of the aircraft. Yet Eastern Flight 66 continued his approach carrying a little extra airspeed. Had adequate standardized procedures been utilized to properly communicate the actual wind shear conditions, neither Flight 66 nor Eastern Flight 902 would have initiated an approach.

The second problem with PIREPs, in relation to wind shear, is that ground controllers lack the operational judgment to interpret the communication and understand the potential danger. In the case of the Kennedy accident, a Flying Tiger captain vividly described the wind shear conditions to the tower controller. The tower controller, not really understanding the significance of the PIREP, responded that the surface winds were "indicating right down the runway at 15 knots." The active runway was not changed. Therefore, it is obvious that for PIREPs to correctly describe the actual situation, a new list of terms needs to be designated which will allow a pilot to effectively communicate the wind shear condition.

PILOT PROCEDURES FOR COPING WITH WIND SHEAR

There are no official Air Force procedures for coping with wind shear. There is nothing on the subject in AFM 51-37 (Instrument Flying) and neither UPT nor IPIS is teaching pilots special procedures to utilize when it is anticipated, with the exception of the first gust of a thunderstorm. There are no recommended procedures in the aircraft manuals to help cope with a wind shear condition. However, there are some informal teachings which I have been exposed to during my flying career which, if diligently practiced, would certainly help to forewarn a pilot of a possible wind shear condition.

detecting & coping with wind shear

Doppler or INS is about the only aid a pilot has to cope with wind shear. By comparing the reported surface winds with the altitude winds during the approach, a pilot can gain some insight as to what might happen when passing through a wind shear. The pilot or navigator, if one is aboard, should continuously monitor for a significant change in ground speed and drift.

It is also a good procedure for a pilot always to know the expected rate of descent it will take to stay on the glide path during the final approach. By referring to the Rate of Descent Table on page XIII of the Low Altitude Instrument Approach Procedures, a pilot can predetermine

ANGLE OF DESCENT (degrees and tenths)	GROUND SPEED (knots)										
	30	45	60	75	90	105	120	135	150	165	180
2.0	105	160	210	265	320	370	425	475	530	585	635
2.5	130	200	265	330	395	465	530	595	665	730	795
3.0	160	240	320	395	480	555	635	715	795	875	955
3.5	185	280	370	465	555	650	740	835	925	1020	1110
4.0	210	315	425	530	635	740	845	955	1060	1165	1270
4.5	240	355	475	595	715	835	955	1075	1190	1310	1430
5.0	265	395	530	660	795	925	1060	1190	1325	1455	1590
5.5	290	435	580	730	875	1020	1165	1310	1455	1600	1745
6.0	315	475	635	795	955	1110	1270	1430	1590	1745	1905
6.5	345	515	690	860	1030	1205	1375	1550	1720	1890	2065
7.0	370	555	740	925	1110	1295	1480	1665	1850	2035	2220
7.5	395	595	795	990	1190	1390	1585	1785	1985	2180	2380
8.0	425	635	845	1055	1270	1480	1690	1905	2115	2325	2540
8.5	450	675	900	1120	1345	1570	1795	2020	2245	2470	2695
9.0	475	715	950	1190	1425	1665	1900	2140	2375	2615	2855
9.5	500	750	1005	1255	1505	1755	2005	2255	2510	2760	3010
10.0	530	790	1055	1320	1585	1845	2110	2375	2640	2900	3165
10.5	555	830	1105	1385	1660	1940	2215	2490	2770	3045	3320
11.0	580	870	1160	1450	1740	2030	2320	2610	2900	3190	3480
11.5	605	910	1210	1515	1820	2120	2425	2725	3030	3335	3635
12.0	630	945	1260	1575	1890	2205	2520	2835	3150	3465	3780

the rate of descent required to maintain the glide path based on his ground speed during the approach. The pilot should enter the chart with the final approach IAS and fly the suggested rate of descent. Naturally, if the pilot discovers that the approach requires a higher rate of descent than indicated by the chart, he could certainly suspect a tail wind component. If it takes a considerably lower rate of descent than charted, a strong head wind should be suspected. Also, if the charted rate of descent is properly maintaining the glide path, but a sudden increase or decrease in vertical velocity is required, the pilot should realize that a change in winds has possibly occurred. In any case, a predetermined charted rate of descent could prove to be a valuable clue of a possible wind shear conditon.

Therefore, PIREPs, the comparison of altitude winds with surface winds, and unusual rate of descent on final approach are about the only means a pilot has to prepare himself for a possible wind shear situation. Of course, none of these procedures adequately forewarns the pilot as to the magnitude of the shear gradient. In other words, will the wind suddenly shear 30 knots in 100 feet or 10 knots per 100 feet for the next 300 feet?

There is little written on how a pilot should cope with wind shear if it is known to exist and has to be penetrated or is suddenly encountered without warning. A pilot's previous training can actually prove to be detrimental in a wind shear condition. A pilot is born and raised to be very critical of airspeed, heading, and altitude control; especially during the final approach phase. If a pilot experiences a tail wind to head wind shear with a corresponding increase in IAS, he is conditioned to respond by retarding the throttles to get back on the correct airspeed as quickly as possible. A rapid correction in this direction might later lead to a power deficiency. However, a pilot's decision to fly 30 knots above the computed approach speed on final or to rapidly advance the throttles to go-around power, if required, could be the difference between landing safely or landing short.

VERTICAL ILLUSION

Approach lights do not provide vertical guidance. As one person put it, "They can be to the pilot what the flame is to the moth." Approach lights normally extend out more than one-half mile from the threshold. They assure the pilot that the runway will soon be visible while leading him and offering lateral and roll guidance. Unfortunately, approach lights provide little information regarding glide path deviation or angle of descent. Moreover, they can give the pilot a disastrous illusion that the aircraft is too high or that its nose has pitched up. Of course, the VASIs are useless at this point in a low visibility situation because they would not normally be visible.

Many pilots have a difficult time remaining on the glide path while transitioning from IMC to VMC conditions. The main reason is that when the approach lights come into view, the pilot has a tendency to go heads-up too soon, before adequate visual cues are available. This tendency is more prevalent if lateral adjustments are required. It becomes easy to fall into the trap of using the approach lights for lateral corrections and simultaneously ignoring the aircraft's position relative to the glide path. As the visibility decreases, a pilot's ability to derive adequate vertical guidance from external cues greatly diminishes. In the time it takes for a pilot to look outside, realize that visual cues are insufficient, and transition back to the flight instruments, many changes can take place in aircraft performance. Usually, though, the pilot will continue visually, not realizing that vertical guidance is inadequate. He will proceed under the false assumption that since he was on the glide path when he broke out of the overcast, his rate of descent must be the proper amount to carry him to the runway. If wind shear should occur during this transition, by the time the pilot realizes what is happening, it can be too late.

A natural question at this point is what is being done technologically to improve the pilot's odds of successfully coping with a wind shear condition. A pilot does not have sufficient warning, adequate instrumentation, or landing systems to safely deal with a wind shear situation. This fact is becoming evident as advanced technology is exposing the real cause of recent crashes. Some ground detection systems and airborne equipment which are under consideration will now be discussed.

GROUND-BASED EQUIPMENT

One of the most unsophisticated ways recently suggested for providing wind shear data was the use of pilot balloons and radiosondes, which are commonly used by meteorologists. However, one of their many drawbacks is that their rate of vertical ascent is in the order of 20 feet/second. This means they would traverse the first 100 feet above the surface in five seconds, the first 200 feet in 10 seconds, thus leaving very little time for observations.

- Acoustic Angle of Arrival Technique: The FAA is presently funding a program based on use of acoustics to measure the actual wind profile throughout the approach and climbout zones. This technique involves transmitting acoustic waves vertically into the air and measuring the horizontal movement caused by any horizontal motion of the atmosphere. Results will be computerized and passed directly to the pilot to give him current data relating to wind shear. The system is reported to be low in cost and looks promising. However, it is still in the experimental stage.
- Acoustic Doppler System: FAA has been conducting tests at Denver's Stapleton Airport on the acoustic doppler system. It transmits acoustic waves by loudspeakers and picks up waves reflected by small-scale temperature and wind speed inhomogeneities in the atmosphere which serve as tracers. Elapsed time is measured to determine the altitude of these tracers above the surface. If the tracers are moving horizontally, then the frequency of the reflected wave will be either higher or lower than the frequency of the transmitted wave depending on the direction of the air flow. By comparing the change in frequency, a doppler velocity of the tracers can be computed. The system can measure and give a doppler readout in 100-foot intervals of the wind shear conditions up to 2,500 feet. A prototype system has been built, at a relatively low cost, but tests indicate that more improvements are needed. At this time, the concept certainly looks promising.
- Laser Doppler System: The basic principle of the laser doppler technique is similar to that of the acoustic doppler system. Transmitted energy consists of a laser beam, instead of acoustic waves, and aerosols are used as tracers. However, development of the equipment is still in the experimental stage and will probably not be available for several years.
- Radar Doppler System: Radar doppler is based on the same principle as the acoustic and laser systems. The only significant difference is that radar can make use of two different modes for transmitting the energy. Radar can transmit either pulsed or continuous frequency waves and, therefore, make use of many different types of tracers in the atmosphere. Since wind shear cannot be measured by the acoustic or laser system without suitable tracers, the choice of the radar doppler system may prove to have significant advantage for routine airport use during all types of weather conditions. This system is still in the experimental stage and the cost estimate has not yet been reported.

GROUND OR AIRBORNE EQUIPMENT

Presently one of the biggest disagreements in the field of aviation is whether or not wind shear systems should be ground-based or part of the airborne equipment. There are definite disadvantages of going for only ground-based systems without any improvements in the present airborne equipment. It would appear to

detecting & coping with wind shear

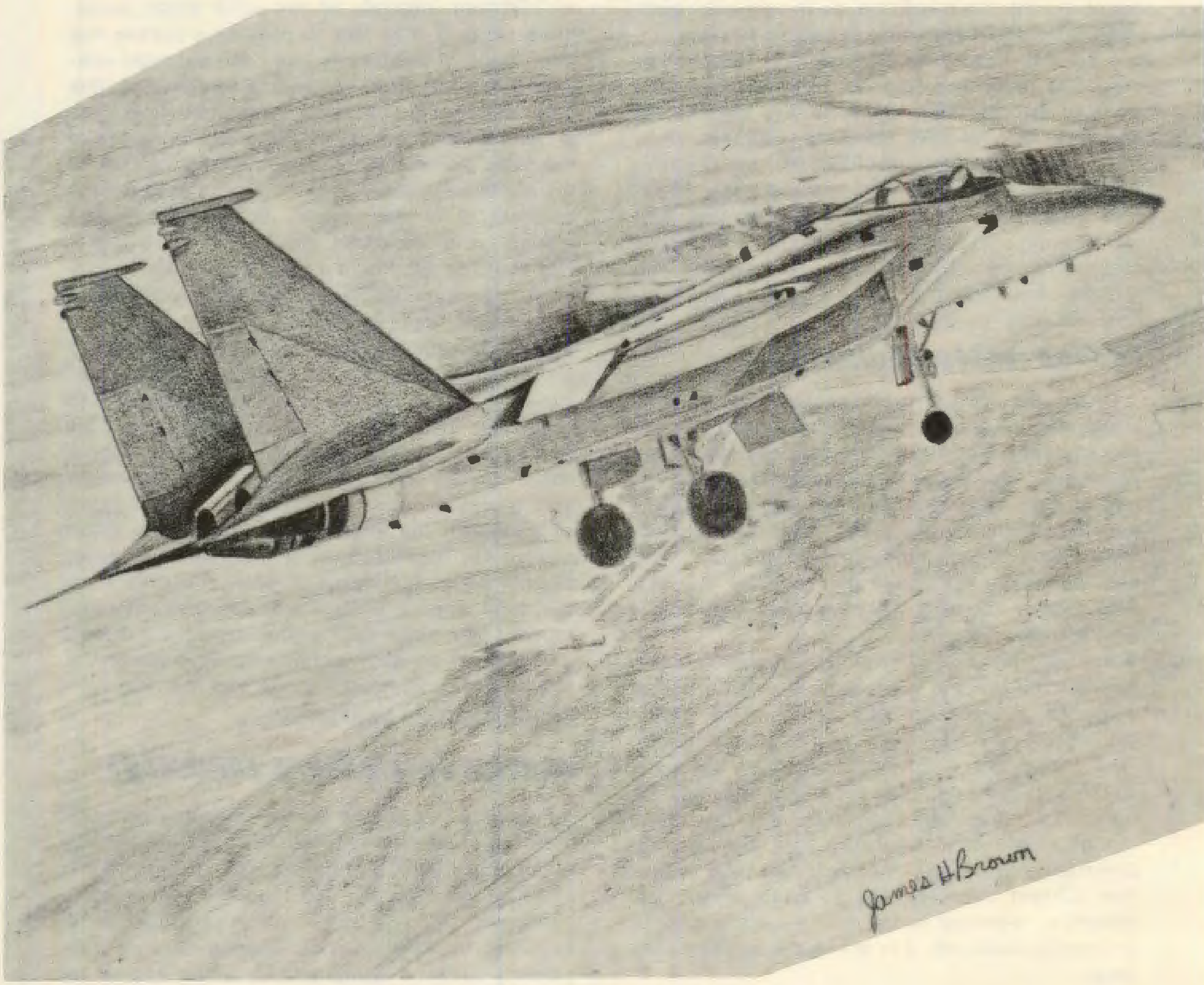
be financially impractical to expect every airport to pay for and install a wind shear detection system on every runway approach path.

Additionally, ground-based systems would not provide the flight crew with data on instantaneous changes of wind shear. Even if it did, the information would, at best, indicate the wind profile on the final approach and not how the shear is going tc affect the aircraft's performance.

Therefore, it would help to examine some of the advantages of airborne equipment which will allow a pilot to safely operate his aircraft. Mr. Rod Gilstrap, the first Vice President of ALPA, offers five advantages to having wind shear equipment on the aircraft:

(1) If airborne equipment were installed, this would enable the pilot to cope with wind shear at every runway throughout the world, regardless of ground aids.

(2) The cost would be nowhere near that required for ground-based systems.



(3) The airborne equipment would overcome the information transfer problems which the ground-based systems would present.

(4) Such equipment would provide instantaneous information to the pilot of action needed to correct for a wind shear condition.

(5) Instrumentation and technology is presently available.

The only point made by Mr. Gilstrap which might require some verification is that of cost. No one can accurately determine the cost of ground-based equipment since the best system has not yet been determined nor completely developed. It would also be quite expensive to install airborne wind shear equipment on every airplane in the United States. However, in all practicality, it is probably the only way to "windshearproof" all future approaches.

AIRBORNE EQUIPMENT

The only instrumentation available on today's market which would help a pilot cope with wind shear is a "heads-up-display" (HUD) system. This system superimposes flight path and thrust information on the aircraft's windshield. HUD gives a visual display of the pitch and power requirements necessary to maintain the glide path. If a pilot encounters wind shear, a visual picture of corrective action necessary would be immediately depicted on the windshield.

One of the best features of the HUD system is that it allows the pilot to focus his eyes on critical flight data and the runway approach lights simultaneously. The system can also be utilized for takeoff acceleration through landing and rollout. HUD has some excellent side benefits other than just coping with wind shear.

(1) HUD is excellent in low visibility approaches since all the critical information is displayed on the windshield.

(2) The system helps to solve the problem of transitioning from instruments to visual flight.

(3) It is independent of any abnormalities in ground-based navigational equipment.

(4) It offers vertical guidance on non-precision approaches.

(5) HUD would enable a pilot to adequately supervise an automatic approach.

Mr. Gilstrap recently testified before a House subcommittee which was examining weather and its impact on aviation safety. He stated that HUD is certainly one effective method of coping with wind shear.

However, HUD is not a wind shear detection system. It will not forewarn the pilot as to the severity of the shear which he is about to encounter. HUD will only give the pilot a pictorial instantaneous indication of the corrections necessary to cope with wind shear after it has been encountered. This is an important point when he is about to enter a wind shear situation that is of such severity that recovery might be impossible.

All future approaches could probably be "shear-proofed" if large sums of money were invested in ground-based detection systems for every runway, new airborne instrumentation for all aircraft, and a massive training program to check out all pilots and support personnel on the operation of the equipment ... but this would be an unrealistic approach. However, incident/accident records show a need for improved training in decision making and in the flight techniques involved in wind shear penetration. Each pilot should understand how wind shear can affect an aircraft during an approach as well as the procedures and techniques necessary for coping with it. Since visual aids would be one of the most effective means of insuring subject comprehension, videotape would perhaps be the best and most inexpensive method of covering the material. The flight simulator could also be used to reinforce this training by requiring pilots to fly approaches under various wind shear conditions.

Controllers should be knowledgeable about the characteristics of wind shear to the extent of being able to understand its dangers from a pilot's standpoint. Tower controllers should not be able to deny landing clearance due to wind shear, but certainly they should consider changing their active runway to alleviate a potentially dangerous situation. Particular attention should be paid to wind shear conditions below 500 feet AGL. Present regulations allow tower controllers to change the active runway if recommended by a pilot. Certainly, a 15-knot crosswind is safer than a 30-knot negative shear.

All crashes are tragic, but it is a complete waste not to look for true causes and explore all possibilities in order to learn as much as possible from them. It has been pointed out how wind shear can cause short, hard, and long landings. Any approach in a wind shear situation carries with it an added risk, but if the pilot forewarns and forearms himself, it can be a manageable risk.

chock talk

...incidents and incidentals with a maintenance slant.

PHANTOM PHLIPS LID

At the completion of the before-takeoff checks, the Phantom's canopies were closed, and the aircrews checked for "lights out and stripes aligned." As the F-4s were on takeoff roll at 160 knots, lead's canopy departed his aircraft. Takeoff was aborted, and lead engaged the departure-end BAK-9.

Six days prior to this incident, the same aircraft's canopy had been written up for closing in 10 seconds. Normal canopy closing time from full open to locked, lock-out is 4 to 9 seconds. The write-up was not corrected at this time. The aircraft had flown two missions between the write-up and the canopy loss. Investigation revealed that the canopy seal pressure regulator was found to be out of tolerance after the incident. This allowed the canopy seal to inflate prior to canopy locking. Additionally, the left aft/overcenter link was out of adjustment and would not allow the roller/overcenter lock combination to mechanically lock the canopy. The canopy unlock light microswitch was out of adjustment which allowed the canopy unlock light to extinguish even though the overcenter link was not locked. The only thing that was holding the canopy closed was the pressure on the canopy actuator. During rotation, the aerodynamic forces overcame the actuator pressure and the canopy departed the aircraft.

One important facet of this incident is the fact that maintenance corrective action was not taken on the original canopy write-up. Had the canopy abnormality been thoroughly investigated, Uncle Sam would have saved $6,575. All canopy malfunctions should be investigated prior to the aircraft's next flight. It can prevent a lost canopy, a lot of money, and possible aircraft loss.

FODed FLIGHT CONTROLS

During the pulloff from a high altitude dive bomb pass, the Phantom pilot initiated a left climbing turn. When rollout from the turn was initiated, the stick was very difficult to move to the right. Rollout was accomplished with rudder and an emergency declared. The aircrew made a controllability check and found that sufficient control existed for slow speed flight. An uneventful landing was then made.

Functional checks of the flight control system revealed a faulty left aileron viscous dampener and left aileron power cylinder. An x-ray analysis also uncovered foreign objects - a loose nut and a piece of rubber - under panels near the aileron power controls. These foreign objects may have contributed to the severity of the flight control malfunction.

Once again, FOD strikes - this time it was the flight controls. Where it will strike again, or if it will cause an accident, is not known. However, you can prevent it. Clean up all work areas, check for loose bolts, nuts, pieces of rubber, safety wire, etc, before you button up that panel. The aircrew who flies the aircraft will appreciate it.

TAC SAFETY AWARDS

Maintenance Safety Award

Master Sergeant James N. Smyth, 355th Organizational Maintenance Squadron, 355th Tactical Fighter Wing, Davis Monthan Air Force Base, Arizona, has been selected to receive the Tactical Air Command Maintenance Safety Award for this month. Sergeant Smyth will receive a certificate and letter of appreciation from the Vice Commander, Tactical Air Command.

MSgt James N. Smyth

Maintenance Safety Award

Airman First Class Kevin J. Webber, 23d Munitions Maintenance Squadron, 23d Tactical Fighter Wing, England Air Force Base, Louisiana, has been selected to receive the Tactical Air Command Maintenance Safety Award for this month. Airman Webber will receive a certificate and letter of appreciation from the Vice Commander, Tactical Air Command.

A1C Kevin J. Webber

Crew Chief Safety Award

Staff Sergeant Robert E. Hartsell, 35th Organizational Maintenance Squadron, 35th Tactical Fighter Wing, George Air Force Base, California, has been selected to receive the Tactical Air Command Crew Chief Safety Award for this month. Sergeant Hartsell will receive a certificate and letter of appreciation from the Vice Commander, Tactical Air Command.

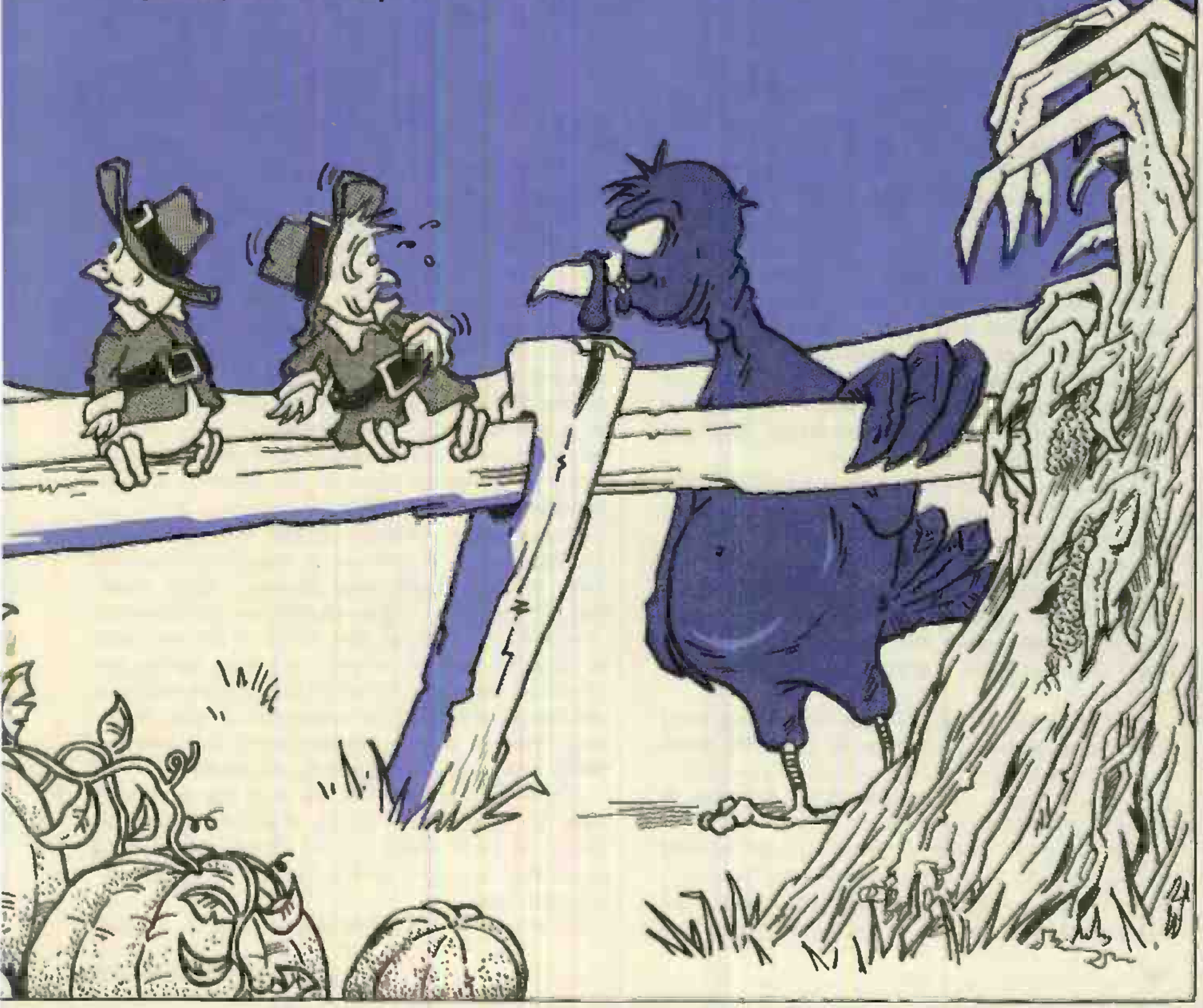
SSgt Robert E. Hartsell


HARDISON

THANKSGIVING

by O. Henry

There is one day that is ours. There is one day when all we Americans who are not self-made go back to the old home to eat saleratus biscuits and marvel how much nearer to the porch the old pump looks than it used to ... Thanksgiving Day ... is the one day that is purely American.



HOW'S PHYZ-BIZ

By Lt Col Harold Andersen
HQ TAC Physiological Training Coordinator

Last month we discussed physiological incidents, and we developed a few points: What comprises a physiological incident, responsibility for reporting, and so on. This month I'd like to discuss the first line of defense against the physiological incident: Physiological Training.

Someone once said, "What you don't use - you lose." It may be that the reference was to some physical skill or capability - since it is well known that disuse causes muscle atrophy (wasting - loss of size) and loss of strength. An arm or leg which has been immobilized in a cast for a period of weeks will exhibit both loss of strength and atrophy; restoration by physical therapeutic means is required (heat, massage, and exercise) for normal function.

The same phenomenon is evident in the psychological arena. Proficiency in the use of acquired knowledge is diminished by disuse, just as surely as unused muscles'atrophy. If not used or exercised periodically, material which was formerly available for instantaneous recall, becomes inaccessible. We forget it! Forgetting is a symptom - just as is loss of muscle strength - of disuse.

At this point, you're probably wondering what this has to do with physiological incidents. Well, it has everything to do with physiological training, which I have already said is the first line of defense against these incidents.

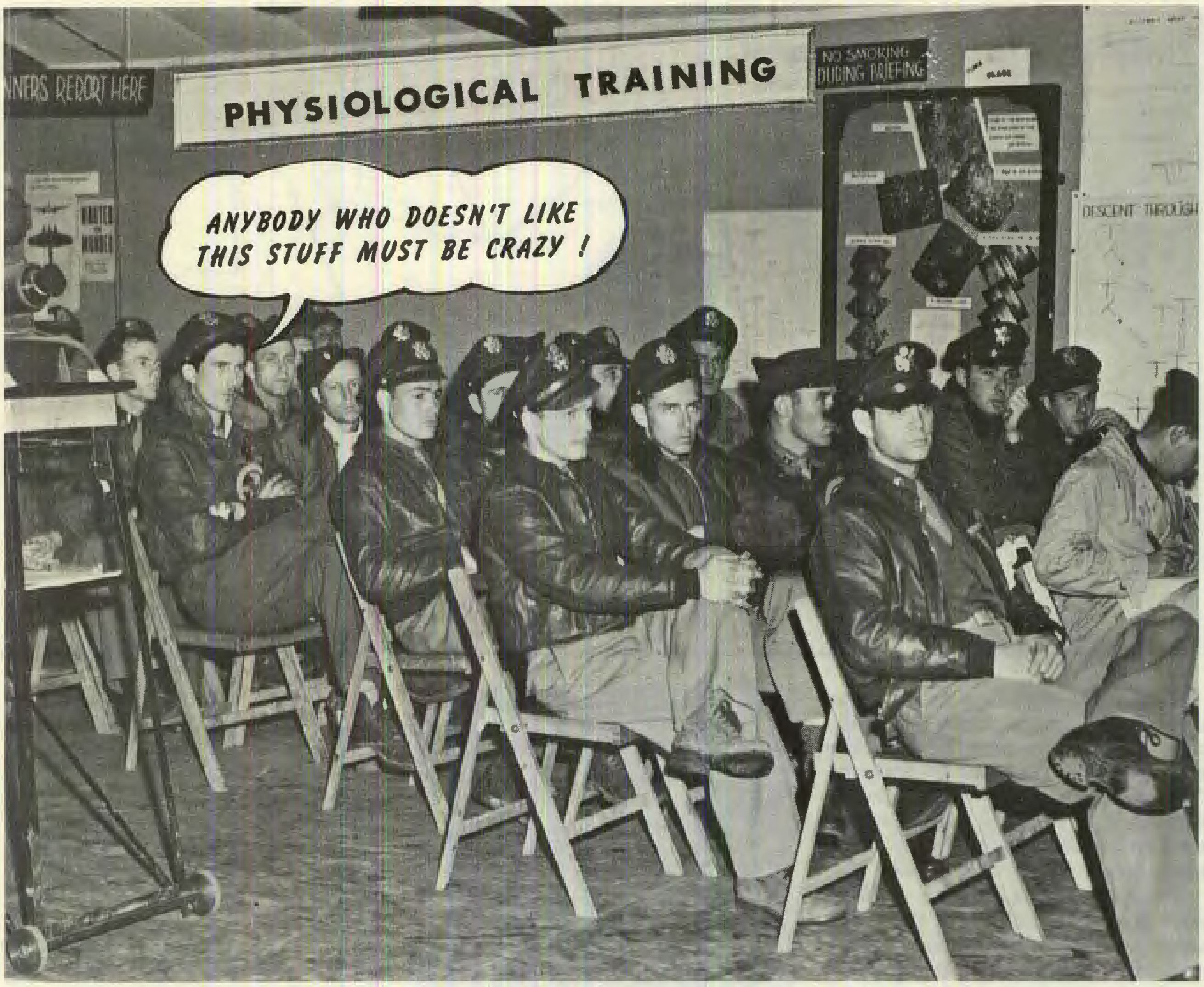
The "Original" phase of physiological training is designed to provide each new aircrew with knowledge of the stresses and changes associated with the aerospace environment and the techniques, methods, and equipment available to counteract them. This phase provides the basis for a proper understanding of protective measures. However, it is an unfortunate fact that over a period of months following intensive training, our ability to remember facts and procedures decreases to the point of reaching a plateau of about 25 percent recall ... i.e., we probably will be able to voluntarily recall only 25 percent of material with which we had been intimately familiar.

To combat this "mental atrophy," physiological training provides a "Refresher" training phase. Once every 3 years, training reinforcement is provided in the form of lectures, discussions, demonstrations, use of procedures and equipment, etc. Refresher training is designed to present not only new information, but is primarily to re-establish formerly learned material at a psychological level where it can be voluntarily recalled ... especially in time of emergency. Information which cannot be recalled instantaneously is of little value.

Physiological Training people frequently hear aircrews say, "I remember all this stuff! Why do I have to sit through these classes?" Good question! I have on many occasions employed a "pre-test" to establish the ability of the students to provide specific answers prior to taking the refresher course, and an end-of-course exam to determine the level of achievement after training. Pre-test scores are uniformly low (around 30%) and post-course scores are quite high (90 - 100% is common). We feel that the student is able to bring some of the material which has been "buried" deep in his mind, to a more prominent position, where it is available for conscious recall.

So the "first-line-of-defense" idea is a valid

YOUR ATTITUDE ?



one. The objective is to make you, the aircrew, capable of quick recall of important information or procedures in time of emergency, and enhance your ability to cope with a physiological incident.

Don't put us down by arriving for training with the attitude, "Well, I'm here, but I dragged my heels all the way!" As you progress through the refresher training (it's only 24 hours), if you remember hearing some familiar themes, give us some credit for bringing it to your conscious mind. It probably wasn't there before! Cooperate with the instructors by participating and contributing - the more you give, the more you'll receive.

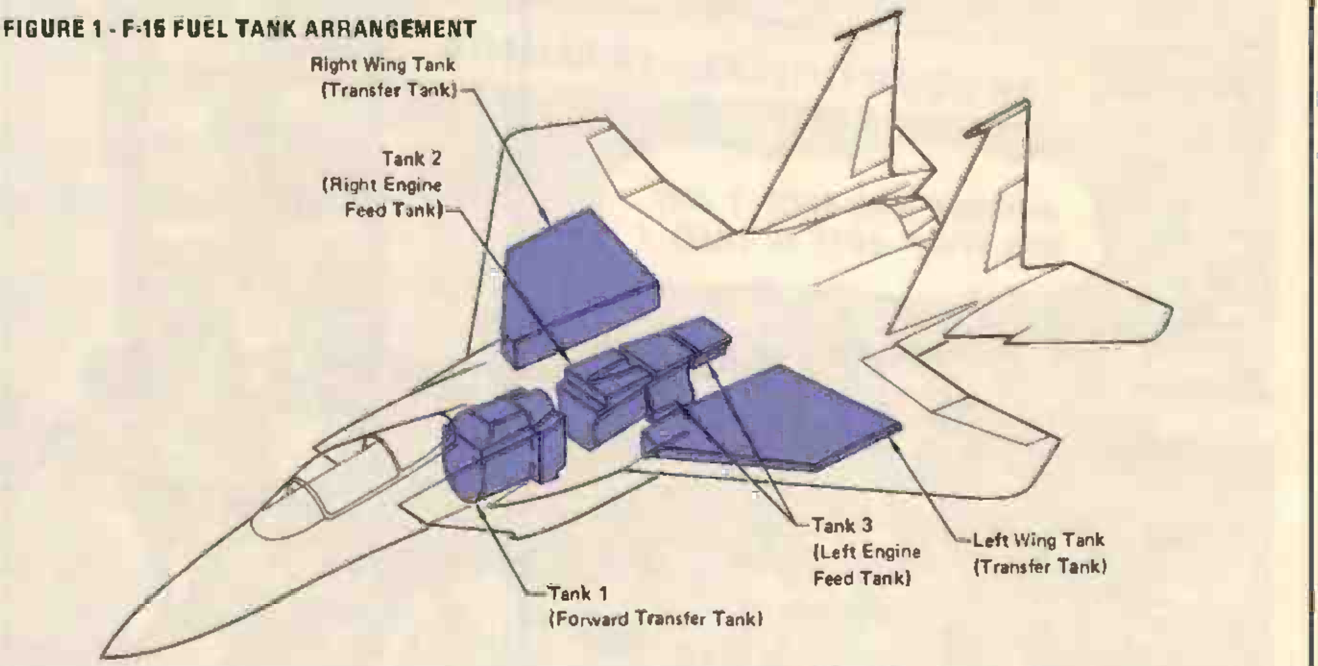
The better your attitude towards physiological training, the better chance you have of successfully coping with a physiological incident/ emergency. And you can take that to the bank!

Water (and Fuel) flow down hill...

F-15 FUEL GRAVITY TRANSFER SYSTEM

By GLENN HARPER/*Lead Engineer, Fuel Systems Design, McDonnell Aircraft Company*

FIGURE 1 - F-15 FUEL TANK ARRANGEMENT



When early man first attempted to carry water from the stream to his fireside, he must have quickly learned the most basic law of fluid system design — "Water flows downhill." And shortly thereafter, he probably also observed the first corollary to that law — "The hill is never in the right place!"

The fuel systems of high performance fighter aircraft must obey that same basic law during any mode of operation that uses the force of gravity to transfer fuel from one tank to another. The fuel system of the Eagle includes a series of fuel transfer pumps to transfer fuel from the transfer to the feed tanks, but in the event of pump failure, a back-up system (the "Gravity Transfer System") lets gravity take over and perform the fuel transfer function. What complicates things for the airplane is that the "hill" is constantly changing because of aircraft attitude, acceleration, etc. — minor matters for our caveman but important to a pilot. However, this characteristic can be used to the pilot's advantage since he can manipulate the "slope" and "location" of the "hill" to improve the performance of the gravity transfer system.

GRAVITY FEED vs GRAVITY TRANSFER

The terms "gravity feed" and "gravity transfer" are frequently used interchangeably in F-15 fuel system discussions; however, they properly refer to completely different functions and the distinction between the two should be clearly understood. The term "gravity feed" (sometimes called "suction feed") describes the function which provides fuel from the feed tanks to the engines when no boost pumps are operating. This gravity feed system is used during the first engine start until the main generator comes on the line. This article addresses only the "gravity transfer" function which refers to a back-up method of transferring fuel from the "transfer" tanks to the "feed" tanks in the event of a failure of one or more transfer pumps.

This article will describe the operation of the F-15 "fuel gravity transfer system;" the effect on the system of the height and slope of the "hill" that the pilot provides; and what you — the jock — should do if a transfer pump failure occurs. Just a few simple rules related to aircraft pitch angle and throttle setting will suffice to bring you and your Eagle safely home.

BASIC FUEL TRANSFER SYSTEM

To understand the Eagle's fuel gravity transfer system, a brief look at its basic fuel system is needed. Fuel is carried in five internal tanks, as shown in Figure 1. Feed tanks 2 and 3, located near the center of the aircraft, supply fuel directly to the engines. Fuel is transferred to these feed tanks from three transfer tanks, one located

FIGURE 2 - F-15 BASIC FUEL SYSTEM SCHEMATIC

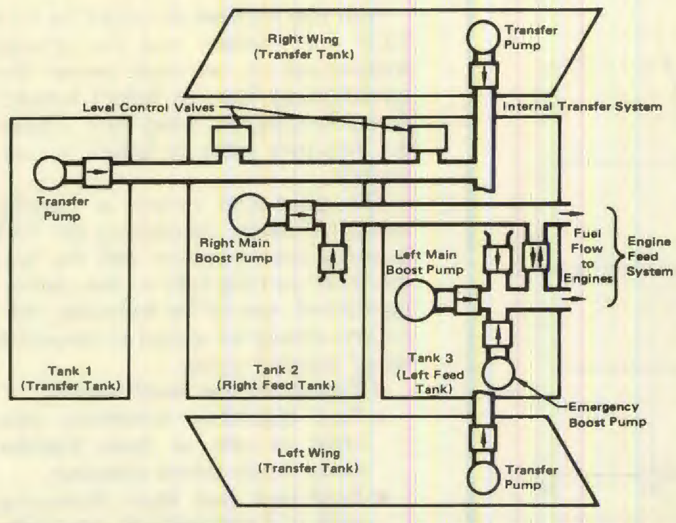
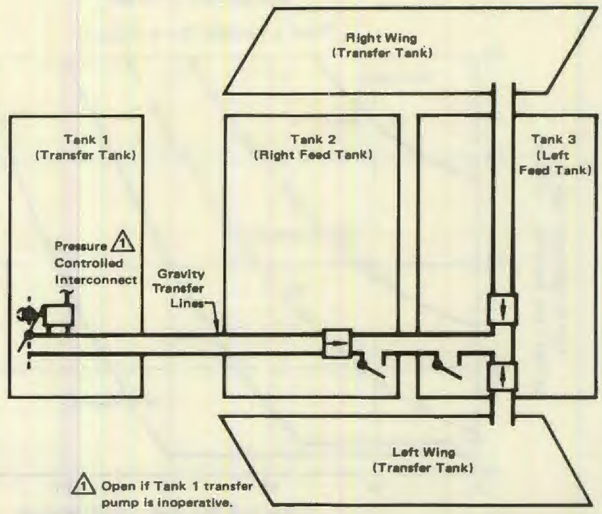


FIGURE 3 - F-15 FUEL GRAVITY TRANSFER SYSTEM



forward of the ammunition container and one in each wing. A continuously operating transfer pump in each of these tanks maintains "full" feed tanks (except for brief periods of high fuel consumption). A schematic of this system is shown in Figure 2.

FUEL GRAVITY TRANSFER SYSTEM

In the event of a transfer pump failure, a "gravity" system allows fuel to flow to the feed tanks by way of independent gravity lines. A schematic of this system is shown in Figure 3.

In order for fuel to flow by gravity, the fuel level (not necessarily fuel quantity) in the *transfer* tanks must be higher than that in the *feed* tanks (check valves prevent flow out of the feed tanks). Figure 4 shows the relative locations of fuel in the transfer and feed tanks during gravity transfer. Fuel is not transferred by gravity from a tank with a failed transfer pump until all other transfer tanks are empty because the transfer pumps which are still operating keep the feed tanks full and thus prevent establishment of the fuel head difference ("h") necessary to provide gravity transfer. The feed tanks cannot be refilled by gravity transfer since the fuel levels of both feed and transfer tanks will decrease simultaneously (except for a temporary increase in feed tank fuel level following throttle retardation from high power settings).

The pilot should note that FUEL LOW warning will occur while there is still a significant fuel quantity remaining in the affected transfer tank, even though the gravity transfer system is operating normally. This is due to the position of the fuel low level sensors in the feed tanks (Figure 4).

The primary factors which affect the operation of the system are "engine fuel demand" and "aircraft pitch attitude." Figure 5 shows how fuel availability is affected by engine fuel demand and aircraft pitch attitude for a pump failure in Tank 1. Figure 6 shows similar information for a wing pump failure. These two figures combine to show that for any transfer pump failure, maximum fuel is available when the engine fuel flow is limited to 3500 PPH/ENG or less, and aircraft pitch attitude is maintained between 3° and 7° nose-up. Transient throttle movements and attitude variations outside these bands are acceptable provided the aircraft is returned within these boundaries prior to feed tank depletion.

Figure 7 shows that the 3500 PPH/ENG limit can be maintained during cruise, loiter, or landing. In addition, cruise, loiter, and landing attitudes are normally within the 3° and 7° nose-up limit.

FIGURE 4 - RELATIVE LOCATION OF FUEL IN THE F-15 TANKS DURING GRAVITY TRANSFER

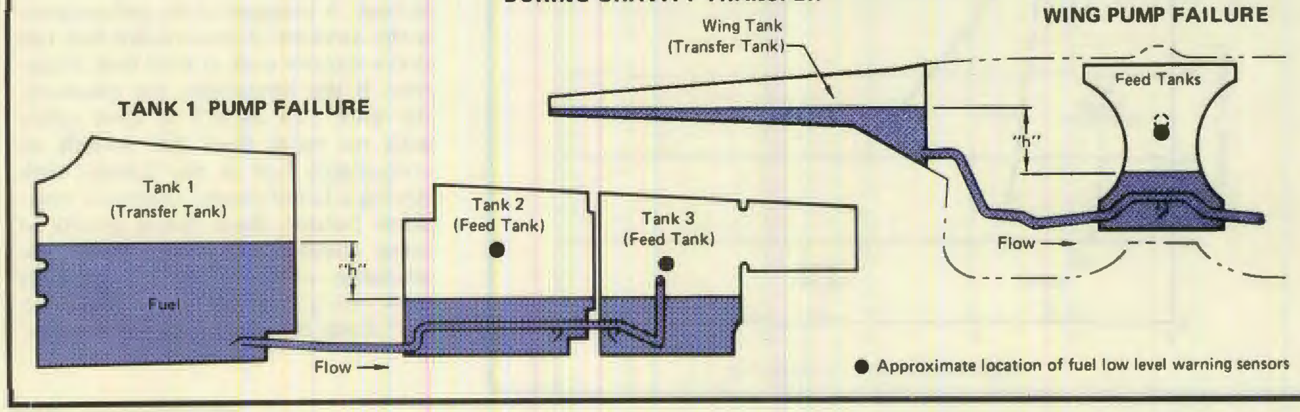


FIGURE 5 - EFFECT OF ENGINE FUEL FLOW AND AIRCRAFT PITCH ATTITUDE

(Tank 1 Transfer Pump Failure)

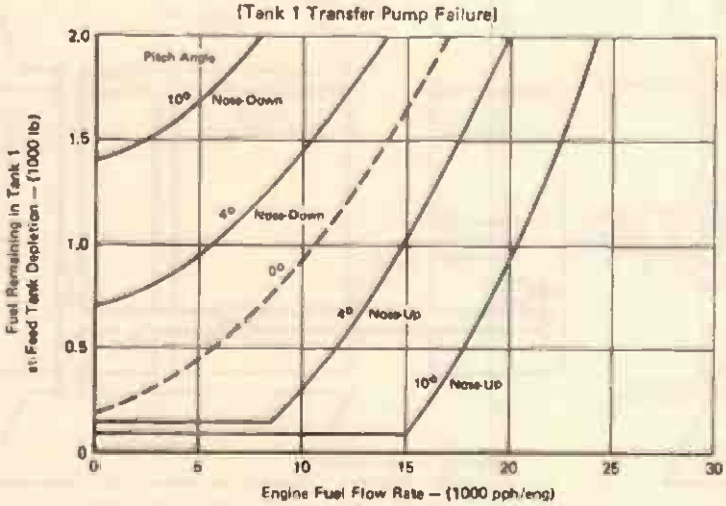


FIGURE 6 - EFFECT OF ENGINE FUEL FLOW AND AIRCRAFT PITCH ATTITUDE

(Wing Transfer Pump Failure)

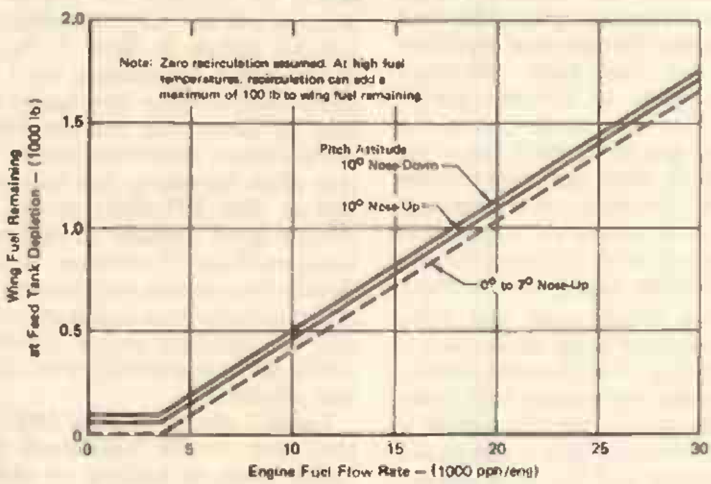
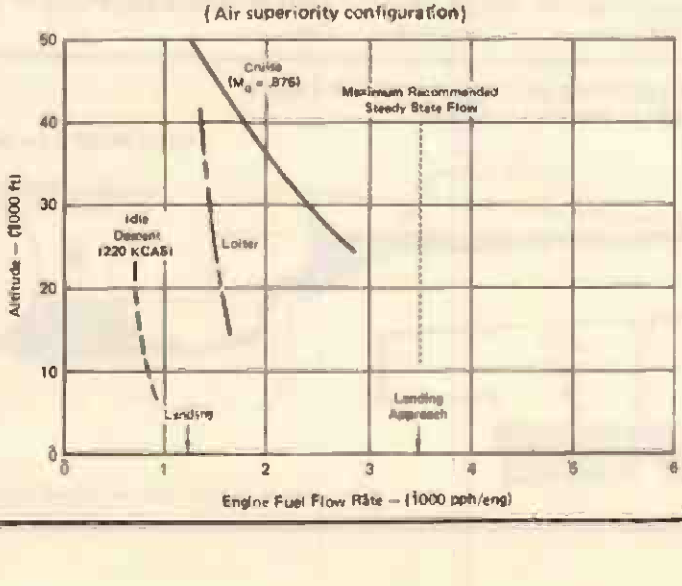


FIGURE 7 - TYPICAL ENGINE FUEL FLOW REQUIREMENTS

(Air superiority configuration)



PUMP FAILURE DETECTION AND PILOT ACTION

Now that we have reviewed the F-15 basic fuel system and the gravity transfer system, we must answer the questions of how to detect transfer pump failures and what pilot actions are required once a failure is suspected.

The pilot can detect a transfer pump failure by monitoring the fuel quantity gaging system and the fuel low level warning light on the caution light panel. Any of the following indications should be reason to suspect a failed transfer pump:

- Premature low level warning.
- Fuel quantities remaining constant in one or more transfer tanks while others decrease.
- Feed tank fuel level decreasing with fuel remaining in any transfer tank.

If a failed transfer pump is suspected, the following action should be taken:

- Minimize fuel consumption and plan to be "on the ground" with normal fuel reserves.
- Do not exceed steady state power settings corresponding to 3500 PPH/ENG and attempt to maintain a 3° to 7° nose-up attitude by observing the pitch angle ladder on the head-up display. (Transients are acceptable outside these power setting and pitch attitude boundaries provided the aircraft is returned within the boundaries prior to feed tank depletion.)
- If failure occurs during takeoff or climb-out, continue to climb to safe altitude but do not exceed intermediate power.

TO CONCLUDE

The F-15 gravity transfer system allows an aircraft with one or more transfer pump failures to return safely to base. A measure of its performance is the amount of *unavailable* fuel left in the transfer tank at feed tank depletion. If the limitations are observed, the pilot can expect to land safely with no more than 150 pounds of unavailable fuel in any transfer tank having a failed pump. Sustained operation outside these limits results in more transfer fuel being made unavailable — that's sort of like early man trying to make water flow "uphill" from the stream to his fireside. ➤

NOTICE

Photo by Joe Lahouchuc

Hi

Like my new outfit? Would you like to have a Fleagle T-shirt, too? It's really easy. My friends at TAC ATTACK need your help in providing aircrews with the best information on survival, weapons delivery, tactics, life support, maintenance, aviation history ... even safety. PACAF and AAC aircrews and maintenance folks shouldn't be bashful either ... we need your inputs, too ... 200,000 eager readers are waiting.

My friends, the editor, Stan Hardison, and Sgt Brown, will provide any editorial and artistic services you need. All we need is an article.

Each month, the author of the best article published will receive a genuine rust-proof, non-magnetic Fleagle T-shirt ... just like mine. Send all articles to:

Editor, TAC ATTACK
TAC/SEPP
Langley AFB, VA 23665
Phone: ATVN 432-2937/3373

I'll be waiting to hear from you!

Walda

DON'T GET CAUGHT WITH YOUR

By Capt Marty Steere

Squirrels gathering nuts ... frost on pumpkins ... birds flying southward in large flocks ... shorter days and longer nights. What does all this mean? Right-on, Sherlock Holmes - winter is about to descend upon us with all the subtlety of a kick in the long johns with a frozen mukluk. The way to get through all the hardships Old Man Winter can muster is by planning and preparation. When you are making an approach in visibility that's lower than a penguin's instep, it's no time to start thinking about the "All Weather Operation" portion in your Dash One. The time for preparation is now while you are in the cozy warmth of the Aircrew Lounge. Obviously, everything about winter weather cannot be covered in one article. All we can do is hit some of the high points ... get you thinking in the right direction. The rest is up to you.

PREPARATION

Preparation for any flight begins long before you ever see your aircraft. During the winter months, it's important that you keep physically fit, rested, and ready to fly. It's easier to catch a cold during this season, but balanced meals and

LONG JOHNS DOWN... or winter weather woes

adequate sleep will go a long way toward keeping you healthy.

Start flight planning early. During winter months, the jet stream shifts to the south, increases in velocity, and is at a lower altitude. If you're headed to the west, plan on shorter legs between fuel stops. Check the freezing level and the temperature/dew point spread so you are aware of where icing conditions will most likely be encountered, and make sure the weather is within your personal limitations. Consider the terrain you'll be flying over, and make sure you have the survival gear you'll need should you have to jettison the aircraft.

Spend some time checking your destination and enroute airfields. Pay particular attention to obstructions which may present a hazard to flight or ground operations ... you may have to circle around them.

PREFLIGHT AND GROUND OPERATIONS

OK, now you're ready to brave the elements and preflight your aerospace vehicle. First of all, dress properly. As a minimum, wear long underwear and gloves in addition to your other flight gear. Again, consider the type of terrain you'll be flying over. Prepare for the worst, and you'll be ahead of the game. Many aircews wear a woolen "watch" cap and use gloves with woolen inserts while preflighting. You can save the lightweight flying gloves for when you are snug in the cockpit. If you have to spend a night on the ground, these items are worth their weight in gold.

Why all the fuss about dressing properly for preflight? If you're preflighting in 20 degree weather, with the wind blowing hard enough to frost your long johns, you tend to rush. Don't. Pay special attention to static ports, control surfaces, and gear wells. Ensure that the aircraft is completely de-iced ... that includes frost on the windscreen and canopy. Carefully check fuel and hydraulic lines for leaks caused by contraction of fittings or shrinkage of packings.

After you're sure you have the safest airplane in the inventory, it's time to climb into that icebox called a cockpit. Be careful of that icy ladder lest you slip and bust your butt. And keep those gloves on. A naked hand on very cold metal can quickly peel your skin away.

Engine start and runup require special precautions. Oil temperatures and pressures must be within specified limits, so keep an eye on the gauges. Cold, thick fluids just may not flow if they haven't been preheated enough, and it's not uncommon for lines, hoses, or seals to give way.

Once the chocks are pulled, go easy on the throttles. Those engines put out more power in cold weather. Taxiing on an icy surface can be an exciting experience. Keeping clear of other aircraft and obstacles can be tricky if guidelines are not discernible. So, keep it slow ... the slower the better, and allow more room for turning and stopping.

TAKEOFF AND ENROUTE

If everything has checked out up to this point, you're ready to slip the surly bonds. Line up on a dry spot ... if one is available. Brakes may not be adequate to complete a full runup, so be ready to complete the checks during the first part of the takeoff roll. Check to make sure the pitot heat is on, and that you have selected the correct setting for cockpit and canopy heating. Directional control can be a problem during the roll, so watch out. Make sure your feet are off the brakes ... a locked wheel on ice can cause a blown tire, or worse, if you hit a dry spot. On takeoff, you'll accelerate faster than normal. But don't be in a rush to get your gear retracted. Stay below gear limit speed, and allow the slipstream to blow off any slush or snow thrown up by your tires ... otherwise you may have frozen gear problems on landing. Don't forget

don't get caught with your long johns down ...or winter weather woes

that you can get engine ice at high power settings and low airspeeds even when not in visible moisture. So, use the anti-ice as directed by your flight manual.

Now that you are on your way, keep ahead of the weather by maintaining a constant weather watch of conditions at your destination and divert airfields. If you have to fly through icing conditions, use the anti-icing system early to prevent ice buildup.

LETDOWN AND LANDING

As you approach your destination, don't be too eager to accept enroute descent unless you're sure that it will not result in excessive fuel consumption or prolonged flight in icing conditions ... know what you're descending into. Before beginning your descent, turn on your defrosters in time to prevent windscreen frosting. Carefully evaluate landing conditions: RCR, crosswinds, landing surface, approach visibility, and barrier location.

Be prepared to locate the runway when you break out ... a runway obscured by snow may be difficult to acquire. Fly an on-speed approach ... those extra knots may be good for the wife, kids, family dog, etc, but they also mean longer landing rolls, which is what you don't need right now (remember ol' $KE = 1/2MV^2$). Plan a firm touchdown to help dissipate some of the energy. Brakes won't be as effective on a wet, slush, or snow covered runway as on a dry slab of concrete, so the drag bag and/or maximum aerodynamic braking is a must. In a stiff crosswind, be patient and hope the brakes' will hold. If you do start to slide, you'll get some help from nosewheel steering, rudder, ailerons, and differential thrust. Don't be hesitant about going around, diverting, or snagging the cable. Once you have directional control, you may want to shut one engine down (if you have more than one) to get rid of residual thrust.

Now that you've got the beast under control, don't get complacent. Taxi-back is often trickier than going out for takeoff. With the same thrust and at a lower gross weight, you may have to ride the brakes more. It may be better to shut down and get towed in than sliding off the taxiway. Don't relax until you are safely in the chocks and the engines are shut down.

As you debonairly climb down from your steed, don't blow it and become a human hockey puck because you're in a hurry to get to maintenance debrief. If you RON at an enroute stop, make sure you, or transient alert, do all those extra little things required in cold weather. Check the Dash One for your particular aircraft.

Many of the hazards of winter operations have been addressed in this article. But, as always, it boils down to the same old fact ... you have the responsibility and authority to ensure the safe handling of your aircraft. Don't let the cold temperatures, ice, snow, or freezing winds press you into a corner or catch you with your long johns down. Adequate preparation is the key to minimizing or eliminating the problems associated with winter weather. ➤

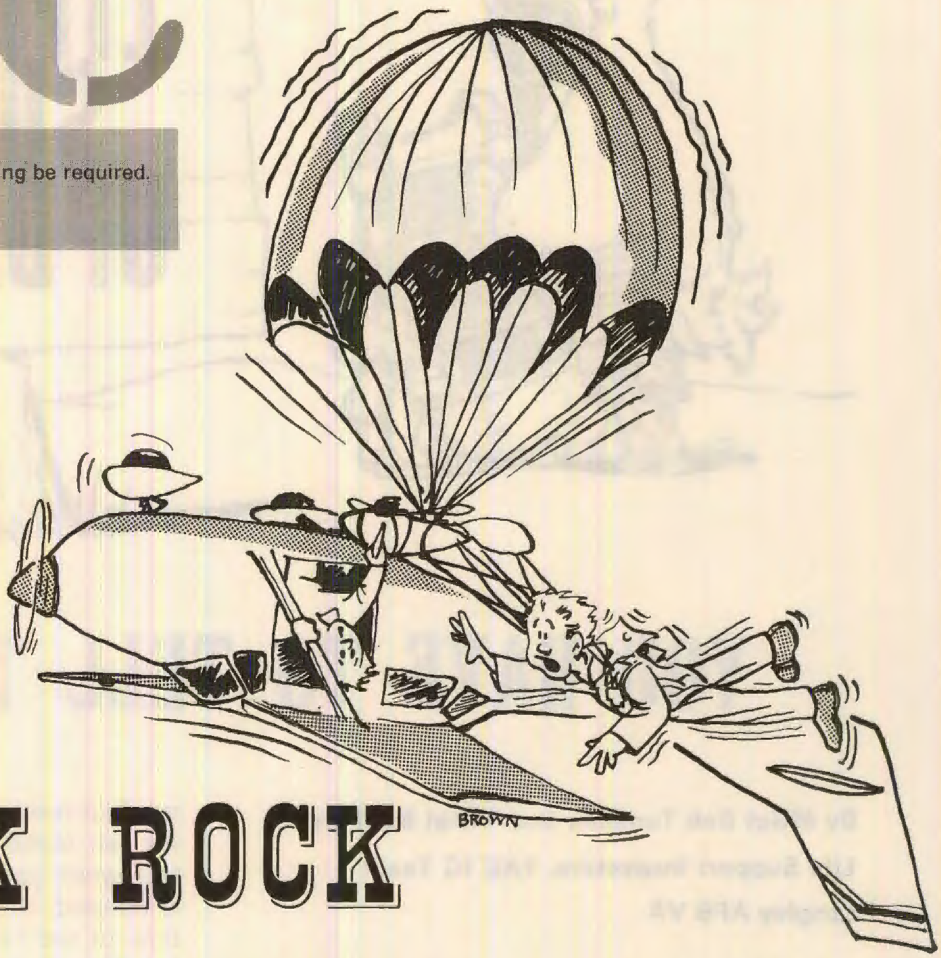
TAC TIPS

... interest items,

mishaps with morals,

for the TAC aircrewman

To whom nothing is given, of him can nothing be required.
Henry Fielding



Bad Day at BLACK ROCK

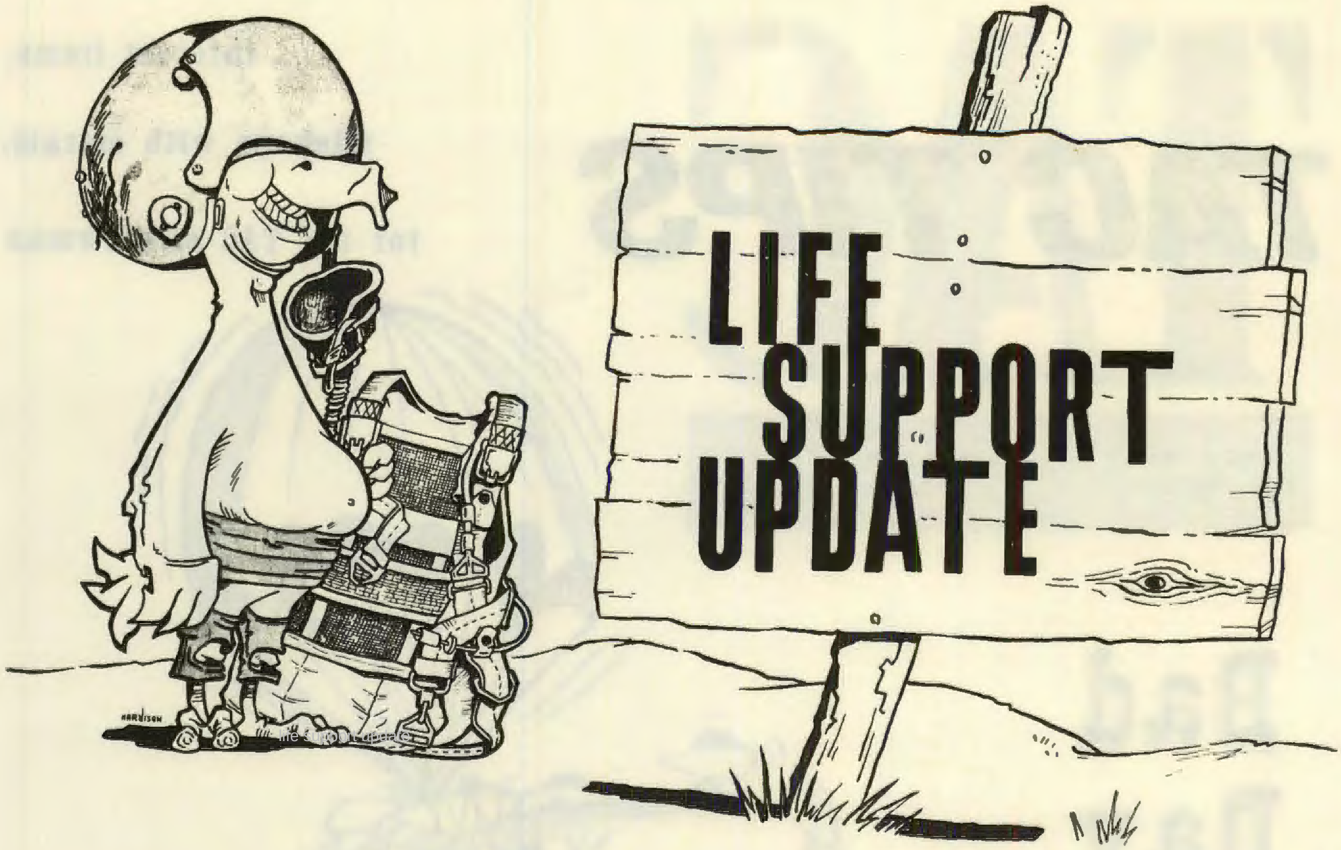
Sport parachuting is an enjoyable and safe pastime for many individuals. However, accidents do occur. One which happened recently is unique.

Three student parachutists planned to make a static line jump from 2,500 feet. The first exited the Cessna 182 with no difficulties. The second slipped on the exit step and fell in front of the landing gear. As he fell, he grabbed at the wing strut, hung momentarily, and let go. During this fiasco, the ripcord was activated. To add insult to injury, the parachute deployed and became tangled with the landing gear.

The parachutist at this point was dangling below and aft of the aircraft. The instructor started to cut the student loose, but before he accomplished this task the student activated his reserve chute! Things began to really look grim at this point because the aircraft stalled, went inverted, and ended up hanging under the parachute. The engine quit. The whole gaggle descended to earth. Remarkedly, no one was killed. The occupant in the aircraft received various fractures; the second student parachutist was uninjured!

For parachuting fans, the reserve chute was an IRVIN 124. It had let down approximately 2,500 pounds at 45 feet/second. In normal conditions it lets down 200 pounds at 20 feet/second.

Courtesy of ATC Flight Safety



YOU HAVE TO TELL THEM WHY

By MSgt Bob Tomkins and MSgt Sid Perry
Life Support Inspectors, TAC IG Team
Langley AFB VA

The pilot is flying his F-15 on a training mission over the cold Atlantic waters. Suddenly, the aircraft shudders violently ... two fire warning lights glow ... the decision is made to eject. As the pilot enters the wind stream, his helmet rotates forward and rolls off his head. The parachute container then strikes his unprotected head, causing a mild concussion. His survival kit deploys automatically and the life raft inflates. However, the sea anchor safety line knot pulls loose, and the line wraps around the inflating life raft.

Our survivor descends into the cold Atlantic. When he retrieves his life raft, he finds that he must untangle the sea anchor line because his life raft looks like a figure eight ... not an easy task when your fingers are numb. After getting it untangled, the pilot attempts to get in, but the bow of the raft tips because the sea anchor is not closely attached ... back into the water he goes. Finally, using the last of his strength, he gets aboard and finds that he can't pull the spray shield up over him because it is stuck together beneath him. While trying to free the spray shield, he upsets the raft and again plunges into the frigid water.

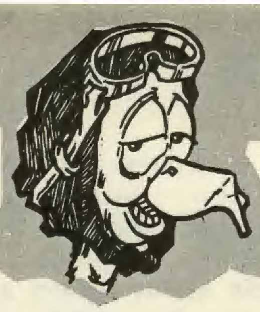
How does this story end? Who knows? However, it does illustrate that seemingly unimportant little things can be a matter of life and death for a crewmember who must eject. Let's take a look.

Two common discrepancies noted during almost all of our inspections are the proper tying of knots on life support equipment and the proper folding of life rafts. You guys and gals not in the life support business may say, "Big deal, what's so important about a knot as long as it holds?" However, each knot is designed for a specific purpose. As well as being secure and staying secure, each knot must untie or unfasten quickly when the need arises. Different types of knots are used on different pieces of life support equipment. If the wrong type is used, or if a knot is tied incorrectly, things like the chin strap or nape strap can come loose during an ejection, causing the loss of a helmet ... or a life raft can become entangled in its safety line.

Proper folding of the life raft spray shield is also important. If the raft spray shield is folded improperly, it may cover the raft, making entry difficult. As you can see from the pilot's ordeal after ejection, this could cost him his life.

How can we protect our aircrews and provide them with equipment that functions properly? The answer is simple. All the problems we have uncovered during our inspections stem from three things: supervision, training, and procedures. Each Life Support supervisor must ensure he has established effective procedures which provide for periodic quality control and quality assurance inspections. Technicians must be properly trained and certified to perform all required tasks. Finally, the workers must be properly supervised. An environment must be created where Life Support personnel are allowed to use their initiative and where they are complimented and/or rewarded on a job well done. They must be motivated by letting them know what must be accomplished, when, and, most importantly, why it must be done in the prescribed manner. These are the keys to successful supervision in all areas ... not just Life Support.

When you are training and supervising ... keep the troops informed. Remember, you have to tell them why. ➤



FLEAGLEGRAM
RESPONSES FROM THE FRONT

fleaglegram responses from the front

OUT-OF-CONTROL PROCEDURES WORK (IN PEACETIME)

By Capt Stanley G. Coker
388th TFW/SL
Hill AFB, UT

The mission was briefed as a one-vs-one ACM mission in the NKP area of northern Thailand and was one of our favorite missions. The challenge of meeting another Phantom head-on and maneuvering to his six o'clock was one of the most demanding in our training program. In obtaining a visual and radar lock-on after the two aircraft have passed, crew coordination was tested to the utmost. My AC and I felt up to the task. Naturally, we managed to trap the other aircraft squarely at our seven o'clock ... at least that is where I finally picked him up after God only knows what kind of maneuver my AC accomplished. The attacker had his nose in the vertical and was ready to slip in for the final humiliation of me and my AC.

"Reverse to a hard right!" I shouted.

When I reacquired the attacker, he was at my five o'clock and now had his nose pointed down. He then appeared to complete one spiral.

"What the heck is he doing now?" I inquired of my AC.

By this time, we were three-quarters of the way around our turn, headed back towards the attacking aircraft.

"He doesn't see us!" I exclaimed as I talked my AC into a visual contact with the other aircraft and started to concentrate on obtaining a radar lock-on.

"Disengage, disengage!" called the AC of the other aircraft.

"Typical of any captain ... just when the lieutenant gains the advantage," I said in disgust and drew in my fangs.

Since both aircraft were Joker fuel, our fun was over and we returned to base. During debriefing, we learned why I couldn't figure out what the other aircraft was doing and why he lost sight of us. When we had reversed our turn, the other aircraft had run out of flying speed. Just as advertised, when the AC had tried to pull his nose into our new direction, the F-4 went in the opposite direction and departed controlled flight.

"Ah ... stick forward, rudder and ailerons neutral," rang loud and clear on his tape recorder.

The BOLD FACE worked and a valuable aircraft was brought home to fly another day. We had some pretty good laughs over it, and we all learned something about the procedures that have been written in twisted metal.

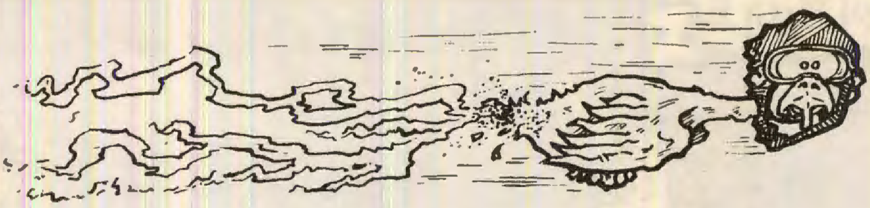
However, time has passed since that incident. I have thought about it over and over. I am still surprised about how quickly the advantage changed hands as soon as the other aircraft went out of control. As the title says, the procedures work in peacetime, and a disengage call ended our engagement - but think about it. If you put your Phantom behind a MIG and then lose control, you may not live to laugh about it on the ground. So, know what you can do with the Phantom and remember - you can give 110 percent, but your machine can only give you the 100 percent it was designed for.

Right On. Fleagle

Pop-up abort criteria matrix on page 26 of the October issue was in error. Matrix below is correct. ED

	MR/MC	IP	STUDENT FWIC/ AWIC	PHASE II	STUDENT OPS CRS	STUDENT CONV. CRS
IF DIVE ANGLE GREATER THAN 5 DEGREES	ABORT	ABORT	ABORT	ABORT	ABORT	ABORT
IF AIRSPEED DURING LOW ANGLE POP-UP IS LESS THAN 350 KTS (200 KTS A-10 & A-37)	ABORT	ABORT	ABORT	ABORT	ABORT	ABORT
AIRCREW LIMITED TO ANGLE-OFF APPROACH (15 TO 90 DEG. OF ATTACK HEADING)	NO	NO	NO	YES	YES	YES
AIRCREW MAY PERFORM DIRECT POP-UP DELIVERIES	NO	NO	NO	NO	NO	NO
AIRCREW MUST ABORT WHEN PUP CLOSER TO MAP THAN PREPLANNED PUP	NO	NO	NO	YES	YES	YES
AIRCREW MUST ABORT IF APEX IS INSIDE OF MAP	NO	NO	NO	YES	YES	YES
MAY PERFORM ELEMENT POP-UPS IN FORMATION	YES	YES	YES	NO	NO	NO
MAY REPOSITION TO MAP WITH PREPLANNED PARAMETERS	YES	YES	YES	NO	NO	NO

TAC TALLY



	TAC SEP	TAC thru SEP 1976	TAC thru SEP 1975	ANG SEP	ANG thru SEP 1976	ANG thru SEP 1975	AFRES SEP	AFRES thru SEP 1976	AFRES thru SEP 1975
TOTAL ACFT. ACCIDENTS ▶	6	27	22	1	8	12	0	3	0
MAJOR ACFT. ACCIDENTS ▶	5	25	20	1	7	10	0	2	0
AIRCREW FATALITIES ▶	2	11	16	2	4	6	0	1	0
TOTAL EJECTIONS ▶	5	22	11	0	4	5	0	1	0
SUCCESSFUL EJECTIONS ▶	4	17	8	0	4	4	0	0	0

FIGHTER/RECCE WINGS

ACCIDENT FREE MONTHS	Unit	
54	127 TFW	ANG
22	132 TFW	ANG
22	123 TRW	ANG
20	156 TFG	ANG
15	122 TFW	ANG

OTHER UNITS

ACCIDENT FREE MONTHS	Unit	
90	135 TASG	ANG
86	182 TASG	ANG
82	507 TAIRCG	TAC
79	193 TEWG	ANG
77	602 TAIRCG	TAC

MAJOR ACCIDENT COMPARISON RATE 75/76

(BASED ON ACCIDENTS PER 100,000 HOURS FLYING TIME)

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TAC	75	7.9	5.4	3.6	2.6	3.1	3.5	5.3	6.4	6.0	6.6	6.3	6.1
	76	2.9	8.6	9.0	7.3	8.0	8.1	6.9	6.8	7.5			
ANG	75	5.3	2.8	5.3	3.7	4.7	6.8	5.8	5.1	5.1	5.5	5.4	5.4
	76	10.5	5.0	6.5	4.8	3.8	3.9	3.3	3.5	3.7			
AFRES	75	0	0	0	0	0	0	0	0	0	0	0	4.9
	76	0	0	11.3	8.1	6.1	4.9	4.1	7.2	6.3			

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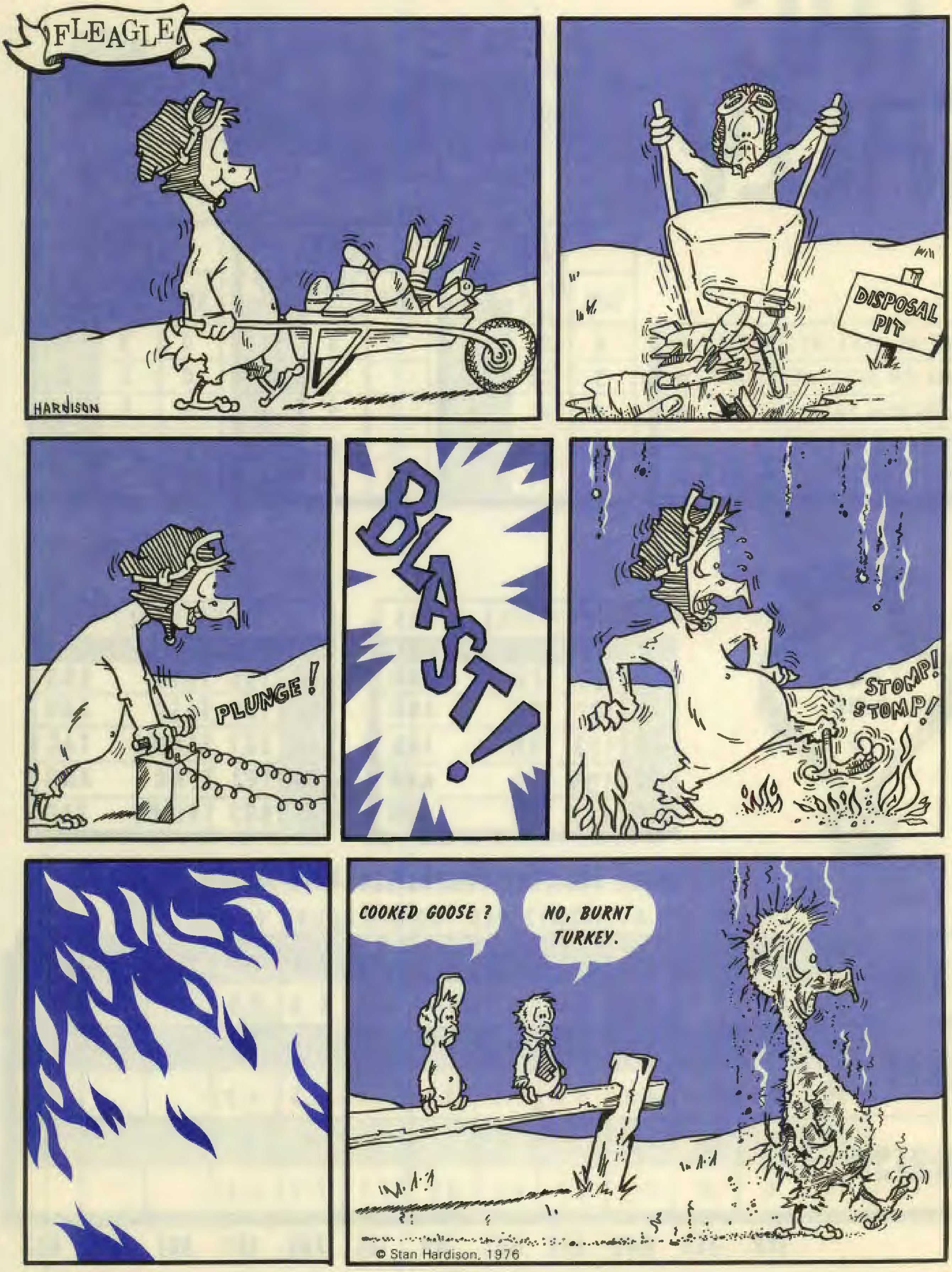
FLEAGLE
HARDISON
DISPOSAL PIT
PLUNGE!
BLAST!
STOMP! STOMP!
COOKED GOOSE ?
NO, BURNT TURKEY.
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